

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-30 (cancelled).

31 (new). A process for the production of acetic acid which process comprises the steps of (1) carbonylating methanol and/or a reactive derivative thereof in a first carbonylation reaction zone in a liquid reaction composition comprising iridium carbonylation catalyst, ruthenium promoter, methyl iodide co-catalyst, methyl acetate, acetic acid and water;

(2) withdrawing liquid reaction composition together with dissolved and/or entrained carbon monoxide and other gases from said carbonylation reaction zone;

(3) optionally passing said withdrawn liquid reaction composition through one or more further reaction zones to consume at least a portion of the dissolved and/or entrained carbon monoxide;

(4) passing said composition from step (2) and optional step (3) into one or more flash separation stages to form (i) a vapour fraction comprising condensable components and low pressure off-gas, the condensable components comprising acetic acid product and the low pressure off-gas comprising carbon monoxide and other gases dissolved and/or entrained with the withdrawn liquid carbonylation reaction composition and (ii) a liquid fraction comprising iridium carbonylation catalyst, ruthenium promoter and acetic acid solvent:

(5) separating the condensable components from the low pressure off-gas;

and

(6) recycling the liquid fraction from the flash separation stage to the first carbonylation reaction zone, wherein the concentration of carbon monoxide in the low pressure off-gas is maintained according to the formula:

$$Y > mX + C$$

wherein Y is the molar concentration of carbon monoxide in the low pressure off-gas, X is the concentration in ppm by weight of ruthenium in the liquid reaction composition, m is about 0.012 and C is about -8.7.

32 (new). A process according to claim 31 wherein the liquid reaction composition together with dissolved and/or entrained carbon monoxide withdrawn from the first reaction zone is passed through a second reaction zone.

33 (new). A process according to claim 32 wherein substantially all the liquid reaction composition together with dissolved and/or entrained carbon monoxide withdrawn from the first reaction zone is passed to the second reaction zone.

34 (new). A process according to claim 32 wherein carbon monoxide in addition to that introduced to the second reaction zone as dissolved and/or entrained carbon monoxide is introduced into the second reaction zone.

35 (new). A process according to claim 34 wherein the additional carbon monoxide is co-joined with the first liquid reaction composition prior to introduction to the

second reaction zone and/or is fed separately to one or more locations within the second reaction zone.

36 (new). A process according to claim 34 wherein the additional carbon monoxide contains impurities.

37 (new). A process according to claim 34 wherein the additional carbon monoxide comprises high pressure off-gas from the first reaction zone.

38 (new). A process according to claim 34 wherein the additional carbon monoxide comprises a carbon monoxide-containing gas stream.

39 (new). A process according to claim 32 wherein greater than 10% of the dissolved and/or entrained carbon monoxide in the liquid reaction composition withdrawn from the first reaction zone is consumed in the second reaction zone.

40 (new). A process according to claim 32 wherein greater than 25% of the dissolved and/or entrained carbon monoxide in the liquid reaction composition withdrawn from the first reaction zone is consumed in the second reaction zone.

41 (new). A process according to claim 32 wherein greater than 50% of the dissolved and/or entrained carbon monoxide in the liquid reaction composition withdrawn from the first reaction zone is consumed in the second reaction zone.

42 (new). A process according to claim 31 wherein methanol and/or methyl acetate are carbonylated with carbon monoxide in the first reaction zone.

43 (new). A process according to claim 31 wherein the concentration of methyl acetate in the liquid reaction compositions in the first and second reaction zones are independently in the range 1 to 70 % by weight.

44 (new). A process according to claim 31 wherein the concentration of water in the liquid reaction compositions in the first and second reaction zones are independently in the range 0.1 to 20% by weight.

45 (new). A process according to claim 31 wherein the concentration of methyl iodide co-catalyst in the liquid reaction compositions in the first and second reaction zones is independently 1 to 20% by weight.

46 (new). A process according to claim 31 wherein the concentration of iridium carbonylation catalyst in the liquid reaction compositions in the first and second reaction zones is independently in the range 100 to 6000 ppm.

47 (new). A process according to claim 31 wherein the ruthenium promoter is present in the liquid reaction compositions in the first and second reaction zones at a molar ratio of each ruthenium promoter : iridium in the range [0.1 to 100] : 1.

48 (new). A process according to claim 31 wherein the ruthenium promoter is present in the liquid reaction compositions in the first and second reaction zones at a molar ratio of each ruthenium promoter : iridium in the range [up to 10] : .

49 (new). A process according to claim 31 wherein the concentration of ruthenium in the liquid reaction compositions in the first and second reaction zones is independently less than 6000 ppm.

50 (new). A process according to claim 31 wherein the concentration of ruthenium in the liquid reaction compositions in the first and second reaction zones is independently 400 to 5000 ppm.

51 (new). A process according to claim 31 wherein the partial pressure of carbon monoxide in the first and second reaction zones is independently in the range 1 to 70 bar.

52 (new). A process according to claim 31 wherein the partial pressure of carbon monoxide in the first and second reaction zones is independently in the range 1 to 15 bar.

53 (new). A process according to claim 31 wherein the concentration of carbon monoxide in the low pressure off-gas is at least 30 mol% and the concentration

of ruthenium in the liquid reaction composition is up to 3000 ppm by weight.

54 (new). A process according to claim 53 wherein the concentration of carbon monoxide in the low pressure off-gas is 30 to 40 mol% and the concentration of ruthenium in the liquid reaction composition is up to 3000 ppm by weight.

55 (new). A process according to claim 31 the concentration of carbon monoxide in the low pressure off-gas is at least 50 mol% and the concentration of ruthenium in the liquid reaction composition is up to 6000 ppm by weight.

56 (new). A process according to claim 55 wherein the concentration of carbon monoxide in the low pressure off-gas is 50 to 60 mol% and the concentration of ruthenium in the liquid reaction composition is up to 6000 ppm by weight.

57 (new). A process according to claim 31 wherein the concentration of carbon monoxide in the low pressure off gas is at least 55 mol % and the ruthenium concentration in the liquid reaction composition is up to 5500 ppm by weight.

58 (new). A process according to claim 57 wherein the concentration of carbon monoxide in the low pressure off gas is in the range 55 to 65 mol. % and the ruthenium concentration in the liquid reaction composition is up to 5500 ppm by weight.

59 (new). A process according to claim 31 wherein the process is operated as

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a continuous process.